

Overview of Management and Restoration Activities in the Lake Tahoe Basin

Updated August 6, 2015

Congressional Research Service

<https://crsreports.congress.gov>

R43224

Summary

The Lake Tahoe Basin (Tahoe Basin) straddles the California-Nevada border and includes Lake Tahoe. The basin is regarded for its beauty, wildlife diversity, clear waters, and recreation. Logging and mining stimulated development in the Tahoe Basin beginning in the 1850s. Development, especially urban development, has affected the basin's ecosystem, leading to a decline in the water quality of Lake Tahoe, tree mortality, heightened wildfire risk, and population declines in fish and wildlife species.

Restoration of the Tahoe Basin began in 1969 under the Bi-State Compact between California and Nevada. The compact authorized the creation of the Tahoe Regional Planning Agency (TRPA). TRPA oversees restoration efforts in the Tahoe Basin and monitors environmental progress, among other things. TRPA also created the Regional Plan, which is a framework for restoring the basin. The plan has specific goals for restoration and focuses on improving water quality, decreasing the number of invasive species, maintaining populations and habitats of sensitive and listed species, and reducing wildfire risk in the surrounding forests. In 2013, the compact was amended by both states to specify that the Regional Plan should reflect changing economic conditions and the economic effect of regulation on commerce. The plan is implemented and funded by state, federal, local, and private stakeholders.

The federal government is involved in the restoration of the Tahoe Basin due to its land holdings and funding for restoration. Federal restoration efforts are authorized under the Lake Tahoe Restoration Act of 2000 (P.L. 106-506) and the Southern Nevada Public Lands Management Act (SNPLMA; P.L. 105-263). Federal agencies coordinate state restoration efforts with other stakeholders through the Lake Tahoe Federal Interagency Partnership. In total, various entities have contributed more than \$1.7 billion to fund 600 projects since 1997. This includes approximately \$576.3 million in federal funds. Stakeholders have requested an additional \$2.5 billion to fund an additional 700 projects from 2008 to 2018. The federal government has been asked to contribute \$645 million of this newly planned spending.

Views on the progress of restoration in the basin have been mixed. Some local groups question whether funds have been spent efficiently, whereas others contend that progress has been significant in restoring the Tahoe Basin ecosystem. Some groups, such as the Sierra Club and the Friends of the West Shore, have raised concerns that environmental standards in the recent update to the Regional Plan are ineffective and that newly permitted development will degrade water quality in the basin. Others, such as the TRPA, contend that the updated plan adequately addresses issues of sustainable development and economic growth, and that the economic well-being of the region is necessary for long-term ecosystem restoration. Sufficient funding for restoration efforts is another issue. This issue may be exacerbated as mandatory federal funding provided under SNPLMA ended in 2012.

Legislation attempting to address some of these restoration issues has been introduced in the current and previous Congresses. For example, S. 1724 would reauthorize \$415 million for restoration and invasive species and forest management programs for 10 fiscal years from the year enacted. One issue for Congress is whether there needs to be oversight to monitor the progress of restoration and to provide input on current controversies concerning the balance between development and the environment in the Lake Tahoe Basin.

Contents

Introduction	1
Background on Lake Tahoe Basin	3
Environmental Concerns in Tahoe Basin	4
Water Pollution in Lake Tahoe.....	4
Wildfires	6
Invasive Species.....	7
Land Use	8
Restoration of Lake Tahoe.....	8
Compact and Tahoe Regional Planning Agency	10
The Regional Plan.....	12
Environmental Improvement Program.....	13
Federal Involvement in the EIP	14
Funding the EIP	15
Other Federal Involvement	16
Measuring the Progress of Restoration	17
Future Restoration Efforts.....	19
Issues for Congress	21
Funding	21
Views on Progress.....	22
Balancing Restoration and the Economy	24
Climate Change.....	25
Conclusion.....	26

Figures

Figure 1. Lake Tahoe Map.....	2
Figure 2. Clarity Levels Since 1968	5
Figure 3. Organizational Scheme of Lake Tahoe Restoration	10
Figure 4. Regional Plan Process Flow Chart.....	13

Tables

Table 1. Federal Funding of Restoration to Agencies in the Lake Tahoe Federal Interagency Partnership, FY2010-2015	16
---	----

Appendixes

Appendix. Chronology of Lake Tahoe Basin	28
--	----

Contacts

Author Information.....	30
-------------------------	----

Acknowledgments	30
-----------------------	----

Introduction

The Lake Tahoe Basin (Tahoe Basin) extends across California and Nevada, bordered by the Sierra Nevada Mountains on the west and the Carson Range on the east (see **Figure 1**). Lake Tahoe lies in the center of the basin and receives flows of melting water from snow caps of the surrounding mountain peaks. The Tahoe Basin contains wetlands, swamps, deepwater habitats, aspen stands, conifer forests, and meadows that harbor more than 1,300 species of plants and animals.¹ Tahoe Basin's natural environment contributes to the development of the area's \$5 billion economy.² Part of this contribution is through recreation: more than 3 million people visit Tahoe annually to ski, hike, bike, fish, and gamble, among other activities.

Development in the Tahoe Basin has affected its ecosystem. In the late 1800s, more than 60% of the basin's forests were clear-cut.³ Continued logging and clear-cutting have led to forest stands that are highly susceptible to drought, disease, insects, and fire.⁴ In addition, water clarity in Lake Tahoe has declined by more than a third since 1967 due primarily to agricultural and urban runoff.⁵ Lake Tahoe also is increasingly threatened by aquatic invasive species (AIS), which outcompete many of the native species in the lake.

Environmental problems in the Tahoe Basin have led to federal, state, local, and private investments in ecosystem restoration. The federal and state governments began to acquire land in the Tahoe Basin in 1969 to protect, maintain, and restore the ecology of the area. Public acquisition and protection of land in the Tahoe Basin continues today. Approximately 87% of the Tahoe Basin is publicly owned. The largest shareholder is the U.S. Department of Agriculture (USDA), which owns 78% (154,000 acres and 508 miles of roads) of the area surrounding the lake.⁶ U.S. Forest Service (FS), as part of USDA, maintains forests, roads, and trails on its federal lands in the Tahoe Basin. In addition to land acquisition, resources also have been dedicated for restoration efforts. Nearly 445 restoration projects have been completed in the Tahoe Basin, and another 234 are ongoing since 1997. As of December 2013, total funding for restoration was \$1.74 billion, of which \$576.3 million was from the federal government.⁷

¹ North Lake Tahoe Visitors' Bureau, "Environment: Tahoe Forest and Wildlife," at <http://www.gotahoenorth.com/about-tahoe/environment/forest-and-wildlife>.

² Tahoe Regional Planning Agency (TRPA), *Environmental Improvement Program Highlights and Accomplishment*, August 2011, at http://www.trpa.org/wp-content/uploads/EIP_4PG_2011_FNL.pdf. (Hereinafter *TRPA EIP Highlights*.)

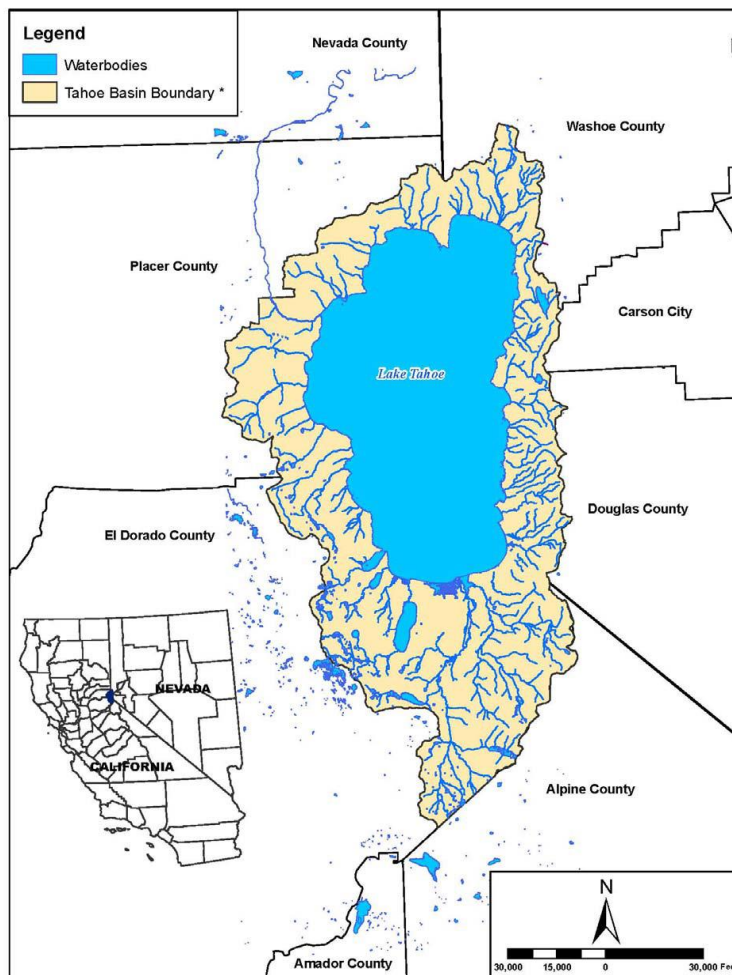
³ California Regional Water Quality Control Board, Lahontan Region and the Nevada Division of Environmental Protection, *Final Lake Tahoe Total Maximum Daily Load*, Carson City, NV, August 2011, p. 2-2. (Hereinafter *Water Board and NDEP TMDL*.)

⁴ U.S. Department of Agriculture (USDA), Lake Tahoe Basin Management Unit, *Trees in Transition*, at <http://www.fs.usda.gov/detail/lbmu/learning/?cid=stelprdb5109573>. (Hereinafter referred to as *Trees in Transition*.)

⁵ Water clarity is measured by lowering a Secchi disk into the water to the depth at which it is no longer visible. *Water Board and NDEP TMDL*, p. 4-1.

⁶ Holdings overseen by USDA Lake Tahoe Basin Management Unit. Website is at <http://www.fs.usda.gov/lbmu>.

⁷ TRPA, *Environmental Improvement Program, August 2014*, August 7, 2014, at http://www.trpa.org/wp-content/uploads/EIP_Summit2014_ALL_8-7-14_FINAL.pdf. (Hereinafter referred to as *EIP 2014*.)

Figure 1. Lake Tahoe Map

Source: U.S. Army Corps of Engineers, *Lake Tahoe Region Aquatic Invasive Species Management Plan, California-Nevada*. September 2009, at http://anstaskforce.gov/State%20Plans/Lake_Tahoe_Region_AIS_Management_Plan.pdf.

There have been multiple federal programs to improve environmental and economic health in the Tahoe Basin. The Lake Tahoe Restoration Act of 2000 (LTRA; P.L. 106-506) states that there is a federal responsibility to restore environmental health to the basin. In addition, under Executive Order 13057 (“Federal Actions in the Lake Tahoe Region”), the Federal Interagency Partnership (FIP)—which includes representatives from the U.S. Environmental Protection Agency (EPA), Department of Defense (DOD), Department of Transportation (DOT), Department of the Interior (DOI), and USDA—is directed to help states preserve and maintain the environmental and economic viability of the area through funding, leadership, stewardship, and collaboration.⁸ Congress has played a role in providing funding for federal collaboration in the basin in the past. In 2000, Congress passed the Lake Tahoe Restoration Act (LTRA; P.L. 106-506), which authorized \$300 million for restoration in Lake Tahoe for 10 years. These funds were appropriated in 2003 as part of a series of amendments to the Southern Nevada Public Lands

⁸ See Executive Order 13057, “Federal Actions in the Lake Tahoe Region,” 62 *Federal Register* 41249, August 1, 1997, at <http://www.gpo.gov/fdsys/pkg/FR-1997-08-01/pdf/97-20497.pdf>.

Management Act (SNPLMA; P.L. 105-263).⁹ Other restoration funding has been provided through agency base appropriations. S. 1724, a bill to reauthorize funding for restoration activities, has been introduced in the 114th Congress.

Background on Lake Tahoe Basin

The Tahoe Basin covers 505 square miles, or 323,200 acres, across the California-Nevada border. Around three-fourths of the Tahoe Basin is in California and one-fourth is in Nevada.¹⁰ The Tahoe Basin is best known for the clear, blue waters of Lake Tahoe. Lake Tahoe is one of the oldest and purest lakes in the world. It also is the second-deepest lake in the country.¹¹ EPA has designated Lake Tahoe an Outstanding National Resource Water (ONRW),¹² a title reserved for waters with exceptional recreational or ecological significance. All waters designated as an ONRW receive special protection against degradation under both state water quality standards and the Clean Water Act (CWA; P.L. 92-500).¹³ Lake Tahoe covers 191 square miles of the basin and holds around 39 trillion gallons of fresh water. Around 212 billion gallons of fresh water enter the lake each year from its 63 tributaries (65%) and direct precipitation (35%).¹⁴ Water exits either through evaporation or through the Truckee River, the only tributary flowing out of the lake. The flow of water from the lake into this river is regulated by the Lake Tahoe Dam.¹⁵

The Tahoe Basin is made up of several ecological habitats, including wetlands, meadows, aspen stands, conifer forests, deciduous riparian lands, shrub land, swamps, deepwater aquatic habitat, marshes, and fens (peat-forming wetlands).¹⁶ The Tahoe Basin also serves as a stop along the Pacific Flyway, which many endangered waterfowl use during migration. An estimated 55 animal species and 43 plants and fungi are state (species of special interest or sensitive species) or

⁹ Southern Nevada Public Lands Management Act (SNPLMA; P.L. 105-263) directs revenue from Bureau of Land Management (BLM) land sales in Carson County (which includes Las Vegas) toward the general education fund (5% of revenue), the Southern Nevada Water Authority (10%), and environmental programs chosen at the discretion of the Secretary of the Interior (85%). This funding can be made available for Lake Tahoe Restoration Projects and for Hazardous Fuels Reduction and Wildfire Prevention (which apply to the Tahoe Basin forests), among other programs. See U.S. Department of the Interior, BLM, “Southern Nevada Public Land Management Act (SNPLMA),” at <http://www.blm.gov/pgdata/content/nv/en/snplma.html>.

¹⁰ U.S. Geological Survey (USGS), “Lake Tahoe Data Clearinghouse,” December 2012, at <http://tahoe.usgs.gov/>.

¹¹ Lake Tahoe is 1 of the 20 oldest lakes in the world. See <http://terc.ucdavis.edu/ed-outreach/documents/docent-training/4science-research.pdf>.

¹² Lake Tahoe was given this designation in 1980. It is one of only three water bodies in the western United States to be considered an Outstanding National Resource Water (ONRW). *Water Board and NDEP TMDL*, p.1-1.

¹³ ONRW is given the highest level of protection under tier 3 of the state’s anti-degradation policy. Water quality must be “maintained and protected.” Proposed new point sources and expansion of existing point sources are prohibited (this applies to any point sources upstream that will have adverse impacts on the ONRW). For more, see the U.S. Environmental Protection Agency’s (EPA’s) *Water Quality Standards Handbook*, Chapter 4, Section 7 (40 C.F.R. 131.12(a)(3), at <http://water.epa.gov/scitech/swguidance/standards/handbook/chapter04.cfm#section5>.

¹⁴ USGS, “Lake Tahoe Data Clearinghouse,” December 2012, at <http://tahoe.usgs.gov/>.

¹⁵ See Bureau of Reclamation, “Lake Tahoe Dam,” at http://www.usbr.gov/projects/Facility.jsp?fac_Name=Lake+Tahoe+Dam&groupName=Overview.

¹⁶ TRPA, *2011 Threshold Evaluation Report*, Final Draft, December 12, 2012, at <http://www.trpa.org/regional-plan/threshold-evaluation/>. (Hereinafter known as *TRPA Threshold Evaluation*.)

federally listed (endangered or threatened).¹⁷ Multiple protected areas and management plans have been implemented around the Tahoe Basin to address federally listed species.¹⁸

Environmental Concerns in Tahoe Basin

There are four primary environmental concerns in the Tahoe Basin: water pollution, drought, invasive species, and land use. These issues are interconnected and, in some cases, influence one another. This section provides brief background on and discusses these environmental concerns.

Water Pollution in Lake Tahoe

Background

Lake Tahoe is classified as an ultra-oligotrophic lake, which is characterized by very low levels of nutrients, specifically phosphorous and nitrogen.¹⁹ Ultra-oligotrophic lakes have low algal production, which often results in clear water with high levels of oxygen and water quality suitable for drinking.²⁰ The high levels of oxygen in ultra-oligotrophic lakes can support many fish species and create a complex underwater ecosystem. Although Lake Tahoe still meets the criteria of ultra-oligotrophic, concerns exist about the future trophic status due to water pollution and runoff.²¹

Over time, ultra-oligotrophic lakes generally are expected to become less oligotrophic. Eutrophication (resulting from excessive amounts of nutrients) is a slow, natural part of lake aging that occurs from natural buildup of dead and decaying organisms.²² However, eutrophication in Lake Tahoe has been accelerated, in part, by human activities, such as urban runoff, fertilizer use, car exhaust, and introduced species.²³ Eutrophication leads to increased algal productivity and loss of water quality, which can lead to fish kills and odor issues.²⁴

Concerns

Lake Tahoe is considered an impaired water body under CWA due to marked decline in the quality and clarity of the water. The water quality of Lake Tahoe has been declining since the 1960s. Water clarity is used as a proxy of the lake's water quality.²⁵ Lake Tahoe has lost around 33% of its clarity since 1968 due to fine particles, phosphorous, and nitrogen entering the water.

¹⁷ Calculated from the Fish and Wildlife Service (FWS) website (<http://www.fws.gov/endangered/>) and USDA Rare Plant and Fungi Survey 2010. Federally listed species under the Endangered Species Act (16 U.S.C. §§1531-1543) include the Lahontan cutthroat trout, mountain beaver, mountain yellow-legged frog, and red-legged frog.

¹⁸ For example, see FWS's documents and plans concerning the Lahontan cutthroat trout at <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E00Y>.

¹⁹ *Water Board and NDEP TMDL*, p. 5-7.

²⁰ Water on the Web, "Understanding: Lake Ecology Primer," at <http://www.waterontheweb.org/under/lakeecology/lakeecology.pdf>.

²¹ See Robert Coats, Joaquim Perez-Losada, and Geoffrey Schladow et al., "The Warming of Lake Tahoe," *Climate Change*, vol. 76 (2006), pp. 121-148.

²² EPA, *National Lakes Assessment: A Collaborative Survey of the Nation's Lakes*, EPA 841-R-09-001, April 2010, at http://www.epa.gov/owow/LAKES/lakessurvey/pdf/nla_chapter5.pdf.

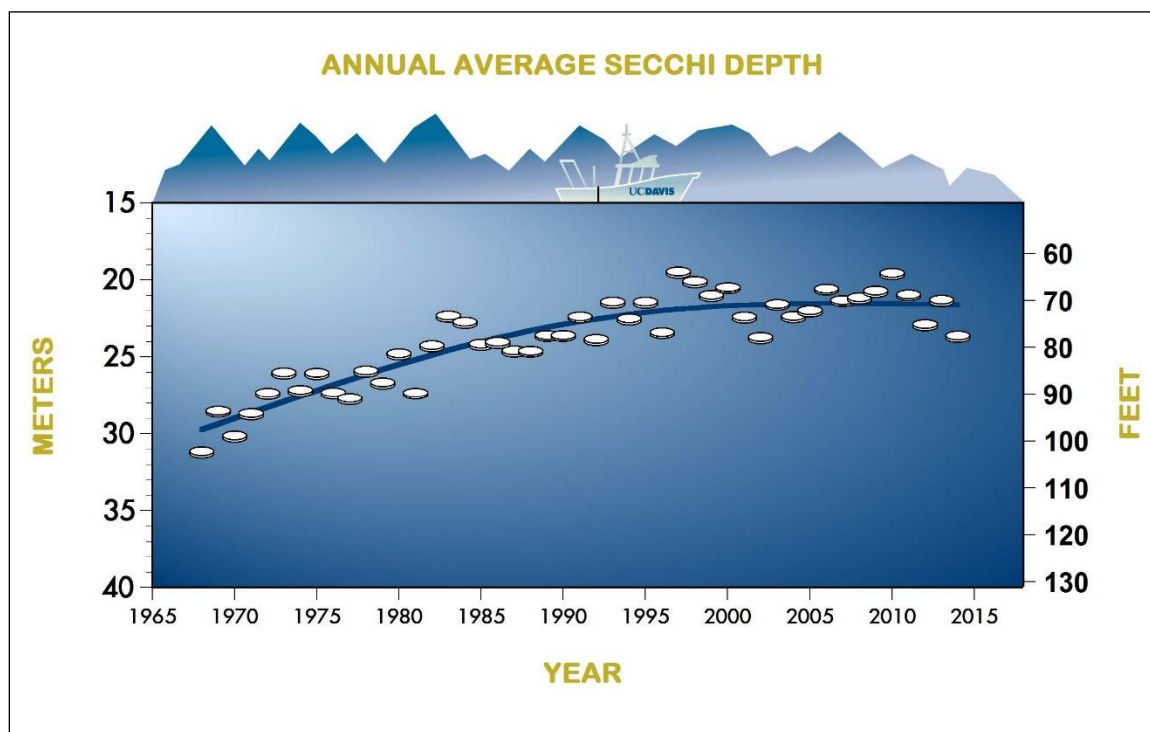
²³ UC Davis Tahoe Environmental Research Center, *Tahoe: State of the Lake Report 2014*, Incline Village, NV, at <http://terc.ucdavis.edu/stateofthelake/>. (Hereinafter known as *TERC State of the Lake 2014*.)

²⁴ EPA, *National Lakes Assessment: A Collaborative Survey of the Nation's Lakes*, EPA 841-R-09-001, April 2010.

²⁵ Clarity readings in Lake Tahoe began in 1962.

As shown in **Figure 2**, the clarity was measured to be 102 feet in 1968; by 2013, the clarity had decreased to 70.1 feet. It increased to 77.8 feet in 2014.²⁶ The average water clarity from 2005 to 2014 was 70.4 feet. Fine particles and phosphorous enter the lake mainly through runoff from urban and nonurban watersheds; nitrogen enters the lake mainly thorough atmospheric deposition.²⁷

Figure 2. Clarity Levels Since 1968



Source: Tahoe Environmental Research Center, *2014 Tahoe Clarity Record*, released April 2015.

The designation of Lake Tahoe as an impaired water body requires that a total maximum daily load (TMDL) be established as part of a management plan to bring Lake Tahoe back into compliance with CWA.²⁸ The EPA approved the final TMDL for Lake Tahoe in 2011. The TMDL addresses three main water pollutants: fine particles, nitrogen, and phosphorus.²⁹ Fine particles in the lake are the main contributor to clarity decline, with 67% of all particles coming from urban runoff.³⁰ The compliance standard for the lake is set at measured clarity of 97.4 feet.³¹ This

²⁶ TRPA, "Lake Tahoe water clarity in 2014 the best in more than a decade," press release, April 9, 2015, at <http://www.trpa.org/lake-tahoe-water-clarity-in-2014-the-best-in-more-than-a-decade-2/>.

²⁷ UC Davis Tahoe Environmental Research Center, *Tahoe: State of the Lake Report 2015*, Section 9.1, at <http://terc.ucdavis.edu/stateofthelake/>. (Hereinafter known as *TERC State of the Lake 2015*.)

²⁸ For more on CWA and total maximum daily load (TMDL) designation, see CRS Report R42752, *Clean Water Act and Pollutant Total Maximum Daily Loads (TMDLs)*, by Claudia Copeland.

²⁹ Estimated fine particle, phosphorous, and nitrogen loads must be reduced by 65%, 35%, and 10%, respectively, under the TMDL.

³⁰ *TERC State of the Lake 2015*, Section 9.1

³¹ This standard was the average annual secchi depth from 1967 to 1971; TRPA, *Lake Tahoe (208) Water Quality Management Plan*, Stateline, NV, June 19, 2013, at http://www.trpa.org/wp-content/uploads/Final-U.S.-EPA-Adopted-Lake-Tahoe-208-WQMP_2013.06.19.pdf.

standard has never been reached since the adoption of the TMDL, and the EPA estimates that it will take 65 years after implementation of TMDLs to reach compliance.³²

Wildfires

Background

The forests in the Tahoe Basin originally were sparse, pine-dominated areas.³³ However, many of the pine stands were clear-cut at the end of the 19th century to provide timber for nearby mining towns. Due to these past logging activities, the forests now are considered overly dense and fir dominated.³⁴ The current nutrient and moisture levels in the soil can support only one healthy tree for every three trees that now grow.³⁵ This high density contributes to tree disease, insect infestation, and tree mortality. In addition, fir trees are not well-suited for drought. It is estimated that a third of the forest in the Tahoe Basin has been killed from insects or drought.³⁶ The number of dead trees, altered composition of the forest, and density of trees contribute to portions of the Tahoe Basin being considered extreme or very high wildfire hazard areas.³⁷ Regional drought conditions also contribute to increased wildfire risk in the Tahoe Basin.

Concerns

The current fuel load (or availability of combustible organic material) in Tahoe Basin forests has created concern among land managers that any forest fire could be devastating to both the environment and the surrounding communities. Although fire and regeneration are part of the normal ecosystem cycle for many forests, some estimate that fires under current conditions could have severe negative economic effects as well as environmental impacts. For example, in 2007, a fire in the Tahoe Basin cost \$11.7 million to control and resulted in a total final loss of approximately \$160 million.³⁸ In addition, ash from wildfires and runoff from burnt lands can negatively impact the lake's water quality and destroy critical habitat for endangered and native species.³⁹

³² *Water Board and NDEP TMDL*, p. ES-3.

³³ USDA, Lake Tahoe Basin Management Unit, *Trees in Transition*, at <http://www.fs.usda.gov/detail/lbmu/learning/?cid=stelpdb5109573>. (Hereinafter referred to as *Trees in Transition*.)

³⁴ *Ibid.*

³⁵ *Ibid.*

³⁶ *Ibid.*

³⁷ Autumn Bernstein and Joan Clayburgh, *Dangerous Development: Wildfire and Rural Sprawl in the Sierra Nevada*, Sierra Nevada Alliance, September 18, 2007, at <http://sierranevadaalliance.com/wp-content/uploads/dangerous-development.pdf>.

³⁸ Chris Carlson, "Angora Fire Vegetation Monitoring Annual Progress Report," Prepared for the U.S. Forest Service (FS), October 2009, at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelpdb5114459.pdf; California Department of Forestry and Fire Protection, *Angora Fire General Information*, July 3, 2007, at http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=184. There have been four fires since this time, but the monetary costs for these fires have not been calculated.

³⁹ *TERC State of the Lake 2012*, Section 6.11.

Invasive Species

Background

There are at least 30 established nonnative species in the Tahoe region. While there are terrestrial invasive species, such as cheatgrass and other weeds, a majority of concerns focus on aquatic invasive species (AIS). Current documented AIS in the lake include the Asian clam, the zebra mussel, Eurasian watermilfoil, curlyleaf pondweed, the largemouth bass, and the bluegill.⁴⁰ These aquatic weeds, clams, snails, and warm-water fish have been introduced into Lake Tahoe both purposefully and accidentally. These AIS have contributed to large shifts in the ecology of the lake. Historically, there was only one native predatory fish in Lake Tahoe, the Lahontan cutthroat trout (*Oncorhynchus clarkiihenshawi*).⁴¹ However, this native trout is no longer found in the lake due to AIS and has been replaced by nonnative mackinaw and other lake trout. Similar declines and losses of native minnows and crustaceans have been recorded, and some have attributed these declines to AIS.⁴²

Concerns

AIS can lead to water quality degradation; loss of native species and habitat; destruction of water conveyance systems; and economic losses.⁴³ Once established, invasive species can have significant economic and environmental costs. The economic impact of new AIS introductions or expansions of current AIS in Lake Tahoe is estimated to have a present value of \$417.5 million over a 50-year period.⁴⁴ In addition, the Asian clam (*Corbicula fluminea*) is replacing native pea clams and comprises almost half of the sediment-dwelling organisms in some areas.⁴⁵ Asian clam beds are breeding grounds for the green alga *Zygnema*, which increases the phosphorous levels in the lakes, contributing to water quality decline.⁴⁶ According to the National Invasive Species Council, the most cost-effective way to fight invasive species is by preventing them from entering the ecosystem.⁴⁷ This philosophy is being applied to temper the concern that Quagga mussels may be introduced from Lake Mead and established in Lake Tahoe. Prevention has become a large focus for many agencies in the Tahoe region after the invasive Quagga mussel was found in neighboring Lake Mead in 2007.⁴⁸ Since 2008, the Tahoe Regional Planning Agency, in conjunction with the U.S. Fish and Wildlife Service (FWS), has been requiring inspections and decontamination of all boats entering Lake Tahoe as a preventative measure. If Quagga mussels enter Lake Tahoe, they could alter the food web, promote the growth of algae, clog water intake pipes, and affect boats. In addition, efforts to eliminate the mussels from the lake likely would

⁴⁰ Lake Tahoe Aquatic Invasive Species Coordination Committee, *Lake Tahoe Region Aquatic Invasive Species Management Plan, California - Nevada*, May 2014, at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3812963.pdf.

⁴¹ Ibid.

⁴² Ibid. For example, predation by the introduced mysid shrimp has been attributed to the elimination or near elimination of three small crustaceans.

⁴³ Ibid.

⁴⁴ Ibid. Economic impacts considered were losses to recreation value, tourism spending, property values, and increased boat/pier maintenance.

⁴⁵ *TERC State of the Lake 2012*. Section 6.5-6.7.

⁴⁶ Ibid.

⁴⁷ National Invasive Species Council, "Prevention," at http://www.invasivespecies.gov/global/prevention/prevention_index.html.

⁴⁸ U.S. Army Corps of Engineers, *Lake Tahoe Region Aquatic Invasive Species Management Plan, California-Nevada*. September 2009, at http://anstaskforce.gov/State%20Plans/Lake_Tahoe_Region_AIS_Management_Plan.pdf.

involve the use of rubber mats and other technology, which would be expensive and could lead to residual harm of the lake's ecosystem.

Land Use

Background

There was substantial development in the Tahoe Basin as a result of the 1960 Winter Olympics in Squaw Valley, and there was another period of substantial development in the 1970s. Development has occurred throughout the Tahoe Basin, often on sensitive lands such as wetlands or riparian areas. From 1981 to 1987, sequential long-term moratoriums were placed on development due to degradation of the lake that had been associated with increased urban development. The final moratorium was lifted with the passage of the Regional Plan for restoration in 1987. The plan included a strict new approval process and oversight of new development in the area (see section below on “The Regional Plan” for more details). Development that occurred before the passage of the 1987 Regional Plan is termed *legacy construction*.

Concerns

Many of the water quality, air quality, and habitat degradation issues facing the Tahoe Basin are amplified by legacy construction. Due to restrictions on redevelopment and renovation after 1987, a large portion of the development in the Tahoe Basin is aging and located in environmentally sensitive areas. These older buildings often do not have best management practices (BMPs) installed for controlling runoff, which can lead to increased urban runoff and watershed deterioration. The Tahoe Regional Planning Agency estimates that 90% of existing homes and businesses in the Tahoe Basin were built prior to the 1987 Regional Plan and without considerations for environmental design.⁴⁹ In addition, the reliance on automobiles and road development due to land-use patterns also may contribute to urban runoff, watershed deterioration, and air quality issues, according to some.⁵⁰

Restoration of Lake Tahoe

The restoration of Lake Tahoe is a complex issue due to the large number of stakeholder groups involved. There are 50 federal, state, local, and private groups involved in current restoration plans and projects (see **Figure 3**). Restoration in the Tahoe Basin is overseen by a regional entity, the Tahoe Regional Planning Agency (TRPA), and guided by a comprehensive plan termed the *Regional Plan*. The Regional Plan includes nine environmental thresholds; each threshold has multiple specific, quantitative, outcome-based goals that the Tahoe Basin must attain to meet that threshold. To help meet these standards, TRPA, in conjunction with the federal government, created the Environmental Improvement Program (EIP). The EIP is a capital improvement program and is updated every 10 years to reflect new environmental issues or concerns in the Tahoe Basin. Within the EIP, there is a list of approved projects to be funded and implemented by

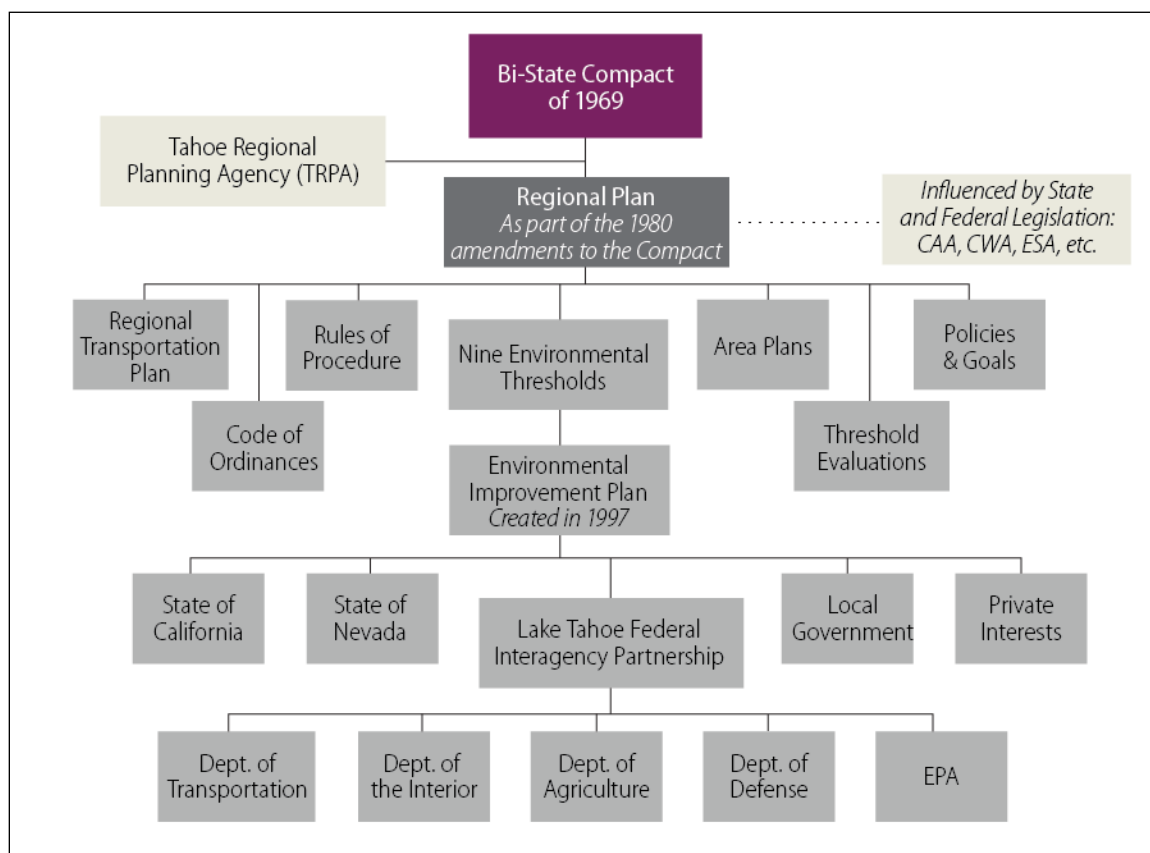
⁴⁹ *Environmental design* refers to planning and design features included in development to address environmental surroundings. This includes reducing impervious land coverage (maintaining open space), installing water savings and management technology, implementing energy efficiency measures, and using native plants and grasses for landscaping. Email from the Tahoe Regional Planning Authority, July 6, 2015.

⁵⁰ Although the air quality in the Tahoe Basin is no longer an issue, the basin was in non-attainment for carbon monoxide (CO) in the 1990s from car exhaust. A CO maintenance plan was created in 1998 that required attainment to be maintained for the next 20 years. Thus, Lake Tahoe will be monitored until 2018 for CO.

state, local, private, and federal partners over a five-year horizon. This five-year list serves as one of the primary guiding documents for federal restoration efforts and collaboration in the basin.

Federal agencies involved in restoration efforts in the Tahoe Basin include the Department of the Interior's (DOI's) Bureau of Reclamation; the Department of Transportation's (DOT's) Federal Highway Administration and Federal Transit Authority; USDA's FS and Natural Resources Conservation Service; the Department of Defense's (DOD's) Army Corps of Engineers; and EPA. Each state has one agency that leads collaboration efforts with federal and regional entities. California state efforts are led by the California Tahoe Conservancy (CTC), housed in the California Natural Resources Agency. Nevada state efforts are led by the Nevada Division of State Lands, which is housed in the Nevada Department of Conservation and Natural Resources. Local stakeholders include local governments, environmental organizations, tribes, and private entities.⁵¹ In addition, state and federal entities, such as the University of California–Davis (through the Tahoe Environmental Research Center [TERC]), the University of Nevada–Reno, the U.S. Geological Survey (USGS), and the Desert Research Institute (DRI), monitor environmental indicators (e.g., air and water temperature, precipitation, snow melt, and clarity) and provide scientific information that aims to inform restoration and management actions and plans.

⁵¹ These local stakeholders include county governments and their respective utility districts, the Washoe tribe, North Lake Tahoe Resort Association, Lake Tahoe Gaming Alliance, and the League to Save Lake Tahoe, among others. Full list can be found on p. 29 of TRPA, *Restoration in Progress: Environmental Improvement Program Update*, 2010, at http://www.trpa.org/wp-content/uploads/EIP_Report_Update.pdf. (Hereinafter known as *TRPA EIP Update*.)

Figure 3. Organizational Scheme of Lake Tahoe Restoration

Source: Congressional Research Service, 2015.

Compact and Tahoe Regional Planning Agency

In 1969, Congress ratified a Bi-State Compact between California and Nevada.⁵² This Bi-State Compact of 1969 marked the beginning of the current collaborative restoration process in the Tahoe Basin. The main focus of this compact was to preserve and restore Lake Tahoe through public acquisition of lands. Further, the compact authorized the creation of TRPA, which oversees restoration efforts in the Tahoe Basin and manages the implementation of the Regional Plan. TRPA also assesses overall environmental progress, among other things.

In December 1980, the 96th Congress amended the Bi-State Compact (P.L. 96-551) in response to worsening environmental conditions in the Tahoe Basin. The amended compact called for TRPA to develop environmental threshold carrying capacities (thresholds), which set environmental goals and standards for the Tahoe Basin.⁵³ The compact also required TRPA to develop a Regional Plan to guide efforts to meet the thresholds. The plan was developed in 1987 based on nine environmental thresholds:⁵⁴

⁵² The original compact was P.L. 91-148. It has since been amended. The current form can be found at http://www.trpa.org/wp-content/uploads/Bistate_Compact.pdf.

⁵³ The thresholds also indirectly define the amount of additional land development that can occur. TRPA must ensure that any new development will not lead to non-attainment of the thresholds.

⁵⁴ TRPA, *Threshold Carrying Capacities*, first released 1982 and last amended in 2012, at http://www.trpa.org/wp-content/uploads/Resolution-82-11_12-2012.pdf.

1. **Water quality:** Objectives include reducing fine sediment particles, phosphorous, and nitrogen levels (as set by the TMDL) to achieve annual average clarity of 97.4 feet or better; and reducing and preventing the introduction of AIS.
2. **Soil conservation:** Objectives include restoring 25% of disturbed stream zones and reducing the total area of impervious surfaces (termed *land coverage* under the Regional Plan).
3. **Air quality:** Objectives include achieving all air quality standards for carbon monoxide (CO), ozone, and particulates under the Clean Air Act (CAA); reducing traffic by 7% of the 1981 base levels; and reducing vehicle miles traveled by 10% of the 1981 base year values.
4. **Vegetation:** Objectives include maintaining at least 4% meadow, wetland vegetation, and riparian vegetation in the Tahoe Basin; maintaining 15%-25% of the Yellow Pine Forest and Red Fir Forest; and maintaining a minimum number of population sites for some sensitive plant species.
5. **Wildlife:** Objectives include maintaining a minimum number of population sites for certain species and eliminating the degradation of significant wildlife habitat.
6. **Fisheries:** Objectives include maintaining 180 miles of pristine stream habitat; restoring 6,000 acres of lake habitat; and reintroducing Lahontan cutthroat trout.
7. **Scenic resources:** Objectives include maintaining or improving scenic travel route ratings, views of individual scenic resources, and quality of views from public recreation areas.
8. **Recreation:** Objectives include preserving high quality recreational experiences for the public.
9. **Noise:** Objectives include establishing maximum noise levels for aircraft, watercraft, motor vehicles, motorcycles, and other off-road vehicles.

TRPA is directed by a 15-member Governing Board composed of 7 delegates from California, 7 delegates from Nevada, and 1 nonvoting presidential appointee.⁵⁵ Six of these members represent units of local government; the other eight voting members represent their respective states' interests. The Governing Board holds monthly meetings to approve projects, amend any part of the compact or plan, and conduct other routine business.⁵⁶ In addition, the Governing Board receives technical and scientific assistance from the Advisory Planning Commission. This 19-member commission is made up of local planners, members of the community, and subject experts.⁵⁷ In addition to its leadership role in restoration, TRPA also serves as the Tahoe Metropolitan Planning Organization, which is tasked with establishing a safe, efficient, and integrated transportation system throughout the basin.⁵⁸

⁵⁵ Contact information for members of TRPA's Governing Board can be found at <http://www.trpa.org/about-trpa/governing-board/>.

⁵⁶ Routine business for TRPA's Governing Board includes litigation and enforcement decisions; legal counsel; budget, personnel, and contract matters; other administrative actions concerning meetings, committees, and staff. More information is available in TRPA's Rules of Procedure at http://www.trpa.org/wp-content/uploads/TRPA_Rules_of_Procedure1.pdf.

⁵⁷ The Advisory Planning Commission includes federal representatives from FS and the Natural Resources Conservation Service, which is within USDA. Contact information for members is available at <http://www.trpa.org/about-trpa/advisory-planning-commission/>.

⁵⁸ TRPA is one of the few metropolitan planning organizations (MPOs) with land-use power. TRPA has the authority to regulate growth and development by setting standards for zoning, subdivisions, waste and sewage disposal, piers,

The Regional Plan

The main guiding document for restoration is the Regional Plan. The plan is a regulatory framework that includes multiple policies and plans, such as the environmental threshold carrying capacities, the goals and policies created by TRPA to help achieve the thresholds, the code of ordinances related to development in the Tahoe Basin, rules of procedure that govern the TRPA Board and staff, area plans for development and conservation, the Regional Transportation Plan, and the Threshold Evaluation Report.⁵⁹ The Environmental Improvement Program (EIP) is also part of the Regional Plan but serves as the implementation mechanism to achieve the environmental goals under each threshold.

The Regional Plan sets levels on potential new development to achieve the thresholds. This authority allows, in part, TRPA to control and limit development in Lake Tahoe. Mechanisms for controlling development include a system of transferrable development rights, caps on land coverage and building height, and public ownership and acquisition programs.⁶⁰

The plan is updated periodically to reflect progress on achieving the thresholds; new environmental concerns; any management plans required by federal laws such as CAA and CWA; and any federal, state, or local laws and regulations. Specifically, the thresholds are evaluated every four years; the next evaluation is expected in 2016.⁶¹ The evaluation serves as a monitoring program and is used to adapt and adjust restoration efforts in the Regional Plan to better accomplish the thresholds (see **Figure 4**). For example, thresholds with the lowest levels of achievement may lead to prioritizing restoration projects to address those specific threshold goals. In addition, threshold goals such as water quality have been amended to reflect new legislation (i.e., TMDL requirements) and environmental concerns (i.e., AIS). The Regional Plan was fully updated in December 2012 and included amended versions of TRPA's goals and policies and its code of ordinances following Governing Board approval. (For more detail, see "Future Restoration Efforts.")

buildings, outdoor advertising, mobile-home parks, house relocation, air and water pollution, watershed protection, and soil and sedimentation control, among others.

⁵⁹ Documents available under the "What is the Regional Plan?" heading at <http://www.trpa.org/regional-plan/>.

⁶⁰ Derek Kauneckis, Leslie Koziol, and Mark Imperial, "Tahoe Regional Planning Agency: The Evolution of Collaboration," Grant from the National Academy of Public Administration, Indiana University, School of Public and Environmental Affairs, 2000, at http://people.uncw.edu/imperialm/Instructor/Papers/NAPA_TRPA_Case.pdf.

⁶¹ Until the Regional Plan update in 2012, thresholds were evaluated every five years.

Figure 4. Regional Plan Process Flow Chart

Source: Tahoe Regional Planning Agency, *Regional Plan: Goals and Policies*, December 2012, pp. 1-5.

Environmental Improvement Program

The EIP serves as the implementing mechanism for the Regional Plan. Through the EIP, TRPA and its partners identify, fund, and implement specific restoration projects in the Tahoe Basin. Within the EIP, TRPA develops and manages a separate list of capital projects designed to achieve the environmental thresholds identified in the plan. Further, this list is managed adaptively to allow for funding of new, unforeseen restoration projects that are necessary (e.g., environmental rehabilitation after the 2007 fire).⁶² The projects on the list represent what TRPA believes can reasonably be funded and implemented over a five-year planning horizon. Thus, this capital project list is updated separately every five years.⁶³ The funding target, broader restoration goals, and focus areas of the EIP are updated only every 10 years by TRPA in response to the environmental and economic conditions of the Tahoe Basin. Since 1997, 445 projects have been completed and 234 projects are ongoing through the EIP.

⁶² Telephone communication between the Congressional Research Service and TRPA, August 7, 2013.

⁶³ The current list applies for January 1, 2012, to December 31, 2016. In total, there are 530 projects recognized. The list is available at http://www.trpa.org/wp-content/uploads/EIP_5-Year_List-2012_through_20162.pdf.

The EIP was last updated in 2008, and it identified more than 700 new or ongoing projects that should receive funding and support through the EIP.⁶⁴ Planned EIP projects include efforts to improve water quality and watersheds, decrease automobile use, improve and increase habitat areas, and preserve species of interest. The updated EIP addresses new issues and focus areas through 2018, including water quality, habitat, and watershed improvements; fuel reduction and forest management; invasive species control; increased walkability and alternative transportation; and applied science, including climate change adaptation and invasive species.⁶⁵ Nonfederal stakeholders contend that a portion of these focus areas may require federal participation.⁶⁶ Projects requiring federal collaboration may include efforts to treat an additional 33,603 acres of forest lands for fuel reduction; restore and recover the threatened Lahontan cutthroat trout to self-sustaining levels; retrofit 300 additional miles of roadways with water quality and watershed improvements; construct 33 miles of bike and pedestrian trails; rehabilitate and construct 29 recreational facilities; and improve stormwater management.⁶⁷

Federal Involvement in the EIP

The most recent five-year capital projects list (from 2012) includes 530 projects. Of these, more than half will receive federal funds or have a federal agency as an implementer.⁶⁸ Federal assistance with the EIP and its projects is administered mainly through the Lake Tahoe Federal Interagency Partnership (LTFIP). Agencies in the LTFIP are USDA, DOI, DOT, DOD, and EPA.

Created through Executive Order 13057 in 1997, LTFIP is directed to provide federal assistance and collaboration for EIP implementation. In addition, the executive order commits the federal government, through the participating federal departments and agencies, to help California and Nevada achieve the environmental standards for Lake Tahoe through collaboration and funding.⁶⁹ The agencies help with restoration of the Tahoe Basin through “stewardship, service, and science.” The federal agencies have many roles in Lake Tahoe, including conducting research and studies; engaging in public outreach and education; regulation; funding; and implementing projects. These agencies mainly focus on watershed and habitat improvement, air quality and transportation, recreation and scenic improvements, and forest health.⁷⁰

LTFIP is overseen by the regional administrators of the federal departments (known as the Tahoe Regional Executives).⁷¹ However, most of the day-to-day activities involved in coordination and implementation are the responsibility of senior local agency officials for each federal agency.

⁶⁴ *TRPA EIP Update*.

⁶⁵ See the *TRPA EIP Update* for descriptions, potential programs, and needs for each focus area.

⁶⁶ Tahoe Fund, “Tahoe Fund Supports New Federal Lake Tahoe Restoration Act,” press release, August 1, 2013, at <http://www.tahoefund.org/media/tahoe-fund-supports-new-federal-lake-tahoe-restoration-act/>.

⁶⁷ Data from *EIP 2011*, *EIP 2014*, and *TRPA EIP Update*.

⁶⁸ The federal government was involved with 305 separate projects as of 2013. Of these, 223 projects have a federal agency assigned as an implementer of the project; 184 projects receive at least partial funding from the federal government.

⁶⁹ See Executive Order 13057, “Federal Actions in the Lake Tahoe Region,” 62 *Federal Register* 41249, August 1, 1997, at <http://www.gpo.gov/fdsys/pkg/FR-1997-08-01/pdf/97-20497.pdf>.

⁷⁰ Lake Tahoe Federal Interagency Partnership, *A Federal Vision for the Environmental Improvement Program at Lake Tahoe*, June 6, 2006, at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_046280.pdf.

⁷¹ *Ibid*.

Funding the EIP

Funding for the EIP comes from federal, state, local, and private groups. The original EIP (1997-2007) called for an initial investment of \$908 million in capital projects and \$58 million for research during its first 10 years. During this period, it received \$1.1 billion in funds from federal, state, local, and private stakeholders. Of this, the federal government has been asked to provide \$654 million. The unfunded need for the EIP for the next five years is approximately \$884 million, with roughly one-third projected as the federal share.⁷²

In total, through December 2013, the federal government contributed \$576.3 million to EIP restoration efforts. Total contributions from all EIP stakeholders (federal and nonfederal) were \$1.74 billion as of December 2013. For the second 10-year phase of the EIP (2008-2018), as of 2013, approximately \$288 million had been committed by the federal government through agency appropriations and mandatory appropriations under the Southern Nevada Public Land Management Act (SNPLMA; P.L. 105-263).⁷³ In total, as of July 2013, approximately \$600 million in funds had been committed by all parties for 2008-2018.

Federal funding for implementing the EIP comes from discretionary and mandatory funding sources. In 2001, Congress passed the Lake Tahoe Restoration Act of 2000 (LTRA; P.L. 106-506), authorizing \$300 million in federal funds for the federal share of the EIP over the next 10 years.⁷⁴ These funds were appropriated under the 2003 amendments to SNPLMA, which provide no more than \$300 million to the Secretary of the Interior to implement EIP projects. This is considered mandatory funding for restoration. SNPLMA receives funding from the selling of surplus federal public lands around Las Vegas.⁷⁵ In 2006, SNPLMA was amended to include a hazardous fuel reduction program, which would provide funding to agencies in the Tahoe Basin for hazardous fuel reduction activities.⁷⁶ In FY2012, SNPLMA completed its \$300 million funding commitment to the EIP; no additional funding has been appropriated to the EIP through SNPLMA since FY2013. Congress would need to authorize new appropriations under LTRA for this to happen. Reauthorization of appropriations under LTRA has been proposed in the 114th Congress: S. 1724 would authorize \$415 million over 10 fiscal years after it was enacted.

Federal funding for restoration activities in Lake Tahoe also occurs outside of the EIP. The federal government has appropriated more than \$318 million for non-EIP federal agency actions in the Tahoe Basin that are directly and indirectly related to restoration (see **Table 1** for the last six years of federal funding).⁷⁷

⁷² Email from TRPA, July 7, 2015.

⁷³ *EIP 2014*.

⁷⁴ This funding included \$10 million a year to be equally matched by the state and local governments through an Erosion Control Grants Program.

⁷⁵ Proceeds go toward environmental improvement, general education fund, and the Southern Nevada water authority. Federal holdings are under BLM.

⁷⁶ This amendment was known as the White Pine Amendment. Lake Tahoe is one of three areas that receive funds from this category. Proposals are submitted directly through the Nevada SNPLMA process, not the Lake Tahoe process.

⁷⁷ This refers to activities necessary to achieve an agency's missions and goals. These activities may result in environmental improvements but are not considered EIP projects as defined by TRPA.

Table I. Federal Funding of Restoration to Agencies in the Lake Tahoe Federal Interagency Partnership, FY2010-2015

(in millions of current dollars)

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	Total Funding FY2010- FY2015
FS	\$33.5	\$35.6	\$28.7	\$38.6	\$31.8	\$26.1	\$194.3
NRCS	0.4	0.9	0.2	0.6	0.2	0.1	\$2.4
Corps	3.4	0.1	0.1	0.2	2.0	0.9	\$6.7
USGS	0.7	0.8		0.1	0.2	0.2	\$2.0
USDOT	29.0	21.5	10.3	20.1	18.0	14.4	\$113.3
EPA	2.6	1.3	2.2	1.8	1.2	0.4	\$9.5
FWS	2.3	3.9	3.5	3.6	1.1	0.3	\$14.7
BOR	3.0	1.3	1.0	1.8	0.1	0.1	\$7.3
[Total Federal Funding for EIP Only]	[40.4]	[46.5]	[43.7]	N/A	N/A	N/A	[130.6]
Total	\$74.9	\$65.4	\$46.0	\$66.8	\$54.6	\$42.5	\$350.2

Sources: Emails from the Tahoe Regional Planning Agency, September 26, 2012, August 23, 2013, and June 29, 2015.

Notes: Funds are for activities directly and indirectly related to restoration. Abbreviations: U.S. Army Corps of Engineers (Corps), U.S. Bureau of Reclamation (BOR), U.S. Department of Transportation (USDOT), Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (FS), U.S. Geological Survey (USGS), Natural Resources Conservation Service (NRCS), and Environmental Improvement Program (EIP). N/A indicates that information was not available for the federal contribution to EIP funding.

Other Federal Involvement

Complementary to the EIP, there are additional thresholds, goals, and related projects required by other federal legislation, such as the CWA Section 208 Water Management Plan and the Regional Transportation and Air Quality Management Plan (Mobility 2035), among others.

Lake Tahoe is subject to EPA oversight due to the lake's 303(d) designation and past CO non-attainment. Impaired waters are placed on the 303(d) list and require the state and EPA to develop a TMDL and Water Management Plan. The Water Management Plan requires that basin-wide fine sediment particles, phosphorous, and nitrogen loads be reduced by 32%, 14%, and 4%, respectively, by 2028 and by 65%, 35%, and 10%, respectively, to reach EPA's water quality standards by 2076.⁷⁸ To achieve these reductions, the Water Quality Management Plan has identified the use of stream restoration projects as well as projects to reduce urban dust levels to lower urban runoff, along with requirements that all homes and businesses complete certified water quality best management practices (BMPs) to control erosion and filter storm water.⁷⁹

⁷⁸ *Water Board and NDEP TMDL*, p. ES-2.

⁷⁹ Best management practices (BMPs) for homeowners may include planting native vegetation, reducing irrigation use, installing parking barriers, replacing dirt driveways with paved driveways, or adding gravel under roof drip-lines. All homes in the Tahoe Basin are required to have BMPs installed. TRPA, *Appendix IE-3- Stormwater Management/BMP Retrofit Program Overview*, 2011, at http://www.trpa.org/wp-content/uploads/11_AppxIE-

The Tahoe Basin also has developed a regional transportation and air quality management plan designed to maintain CAA standards.⁸⁰ The new Regional Transportation Plan, Mobility 2035, is required by state, regional, and federal laws, including California's SB375, the Bi-State Compact, and the Moving Ahead for Progress in the 21st Century Act (MAP-21; P.L. 112-141).⁸¹ Mobility 2035 provides funding for projects that encourage the development of walkable, mixed-use town centers, improved transit options, and reduced dependency on automobiles to meet water and air quality standards.⁸² This plan will include work and improvements on federal roads, in part to meet both Bi-State Compact thresholds and TMDL measures.⁸³

FWS plays a significant role in the management and recovery of federally listed species in the basin, as well as the AIS Program. FWS has implemented recovery plans for the Lahontan cutthroat trout under the ESA and monitors other federally listed species in the Tahoe Basin.⁸⁴ FWS also is involved in the monitoring and protection of nesting bald eagles and golden eagles as authorized by the Bald and Golden Eagle Protection Act (16 U.S.C §668). In addition, FWS was appropriated \$5 million between FY2008 and FY2014 to implement an AIS program within the Tahoe Basin.⁸⁵ The AIS Program inspects and, if necessary, decontaminates all boats entering the lake, in addition to funding pilot AIS eradication projects. FWS has developed an AIS Management Plan for the lake, and it chairs the Lake Tahoe AIS Coordination Committee.

USGS has created an Internet-based clearinghouse of scientific information on the Lake Tahoe Basin with geographic information system (GIS) capability.⁸⁶ USGS is involved in scientific research and monitoring activities in the basin, partnering with federal and state agencies, as well as with research centers (e.g., TERC, University of Reno, DRI). USGS is part of the Tahoe Science Consortium, a collaboration between research organizations and federal agencies whose objective is to promote science and provide the best available scientific information to guide restoration and support adaptive management strategies within the Tahoe Basin.⁸⁷

Measuring the Progress of Restoration

The progress of restoration in the Lake Tahoe Basin is measured through environmental quality indicators, such as water clarity, native fish populations, and number of bird nests. These indicators are extrapolated to measure the attainment of threshold goals. Every four years, these data are combined and used to measure restoration progress and the attainment of each threshold.

3_TRPASTormwater_FINAL.pdf.

⁸⁰ The Tahoe Basin was in non-attainment for CO until 1996. The maintenance plan for attainment will be in effect until 2018.

⁸¹ Moving Ahead for Progress in the 21st Century Act (MAP-21; P.L. 112-141) requires TRPA (as an MPO) to develop a long-range transportation map. In addition, the Bi-State Compact requires that a regional transportation plan be maintained. SB 375 passed by California requires the Tahoe Metropolitan Planning Organization to develop a sustainable community strategy that will reduce greenhouse gas emissions per person by 12% in 2020 and by 7% in 2035 (the figure is lower in 2035 due to population forecasts and economic recovery).

⁸² The actual transportation plan can be found at <http://tahoemopo.org/Mobility2035/>.

⁸³ Includes U.S. Hwy 50. Currently, the U.S. Hwy 50 traffic threshold has been reached. The threshold is set at 7% below 1981 traffic. In 2011, traffic volume was 22% lower than in 1981.

⁸⁴ For example, the mountain yellow-legged frog has a recovery plan that addresses all California populations.

⁸⁵ For more information on the Aquatic Invasive Species Program, see FWS, "Lake Tahoe Aquatic Invasive Species Program," at http://www.fws.gov/nevada/nv_species/invasive_species/lt_index.htm.

⁸⁶ See USGS, "Lake Tahoe Data Clearinghouse," December 2012, at <http://tahoe.usgs.gov/index.html>.

⁸⁷ For more on the Tahoe Science Consortium, see <http://tahoescience.org/>.

Findings then are published in an independently peer-reviewed threshold evaluation report.⁸⁸ The threshold evaluation was last completed in 2011; it found that a majority of the specific final goals established as indicators for the nine thresholds had been attained. However, only approximately two-thirds of all indicators could be quantifiably measured.⁸⁹ The status of the other one-third of the indicators is currently unknown. In addition, attainment for some indicators may not indicate actual environmental improvement. There are several types of indicators: numerical standards, management standards, and policy standards. Often management standards, while considered quantifiable, can be evaluated only based on whether a program has been implemented; attainment for these standards does not indicate that the program has led to actual achievement of a goal.

Some of the indicators with the highest levels of attainment were air quality, soil conservation and impervious cover, recreation facilities, and wildlife. In 2011, 361 days of the year were measured at highest air quality. The other four were measured at moderate air quality.⁹⁰ The threshold evaluation also found that all special interest species—both state and federally listed—had stable or improving populations. In particular, the projects for the Lahontan cutthroat trout, Tahoe yellow cress, and golden eagle were recognized as successful. The winter water clarity of the lake has improved the last few years, and modeling predicts that the winter clarity will continue to improve. The annual water clarity and winter clarity both averaged 78.7 feet in 2014, the best in more than 10 years and an improvement over the 2013 annual clarity measurement of 70.1 feet and winter clarity of 77.9 feet.⁹¹

Major accomplishments and projects completed in the Tahoe Basin, through 2014, include the following:⁹²

- Fuels reduction treatment of 55,690 acres of forests;
- Wildlife habitat improvements of 15,945 acres (including 1,509 acres in sensitive stream zones);
- 739 acres of wetlands restored;
- 3,103 acres of sensitive land acquired by public entities;
- Watershed improvements on 674 miles of roads;
- Renovation of 13,444 private homes to lower levels of urban runoff;
- 137 miles of new bike and pedestrian trails;

⁸⁸ The independent review board includes seven members representing academia and environmental consulting firms who are considered experts in any of the following fields: air quality, water quality, recreation/tourism, wilderness management, forest health, fisheries, or wildlife.

⁸⁹ There were 151 indicators, but only 92 indicators can be quantified. Numerical standards and management standards are considered quantifiable; policy standards are not quantifiable. *TRPA Threshold Evaluation*.

⁹⁰ *TRPA Threshold Evaluation*; the next threshold evaluation is expected in 2016.

⁹¹ However, water clarity is affected by precipitation amount; the current drought conditions in California and Nevada have resulted in low levels of runoff (fine sediment particles, nitrogen phosphorus), which is beneficial to water clarity. Conversely, 2013 had high amounts of precipitation, which resulted in more runoff and pollutants and in decreased clarity. TRPA, “Lake Tahoe water clarity in 2014 the best in more than a decade,” press release, April 9, 2015, at <http://www.trpa.org/lake-tahoe-water-clarity-in-2014-the-best-in-more-than-a-decade-2/>.

⁹² Data from TRPA, *2014 Annual Report*, February 26, 2015, at <http://www.trpa.org/wp-content/uploads/2014-Annual-Report.pdf>; TRPA, *2014 Annual Report with Staff Summary*, February 2015, at <http://www.trpa.org/wp-content/uploads/2014-Annual-Report-With-Staff-Summary-Regional-Plan-Measures-Area-Plan-Metrics-and-Sustainability-Indicators.pdf>; and *EIP Highlights*.

- Upgrades of 20 transit stations and increased transit ridership to 1.5 million people a year;
- Reintroduction and signs of recovery of the Tahoe yellow cress and Lahontan cutthroat trout;
- 37,000 watercraft inspections and more than 18,000 watercraft decontaminations; and
- Treatment of 35.75 acres of weeds and Asian clam infestations in Lake Tahoe.

Some point to these accomplishments as signs of success, but others contend that much more needs to be done. TRPA cites increasing algal productivity, declining summer clarity, increasing wildfire threat, and the growing presence of invasive species as areas of concern.⁹³ The reasons for and solutions to these continued issues with summer and nearshore lake clarity, phytoplankton and algal productivity, swamp habitats, and invasive species are contested. Some local environmental groups argue that current restoration does not do enough to address the causes of environmental degradation; others assert that the issues persist due to warming patterns in the region that cannot be resolved exclusively through restoration.⁹⁴ Notably, although there have been improvements in annual lake clarity, clarity still needs to improve by more than 20 feet to reach the clarity standard set by the EPA under the TMDL.

Future Restoration Efforts

After more than seven years of preparation, discussion, and development with stakeholders, the Regional Plan was updated in December 2012 for the first time since its passage in 1987.⁹⁵ The updated Regional Plan was intended to reflect the changing economic and environmental conditions in the Tahoe Basin, incorporating changes to regulatory ordinances and policies that aim to promote sustainable development in the basin. Many environmental aspects of the Regional Plan were not changed. However, TRPA added provisions and exemptions to encourage environmentally based renovation of buildings and the establishment of city centers. The updated Regional Plan includes provisions that provide additional development rights to property owners who transfer their development in sensitive areas to town centers; eliminate existing barriers to environmental redevelopment of older buildings; expand land coverage exemptions for previous construction and alternative transportation roadways; simplify the permitting process for homeowners into one process that meets local, state, regional, and federal requirements; and add incentives for completing BMPs.⁹⁶ In addition, the updated plan allows for the development of an additional 3,200 residential units and 200,000 square feet for commercial use. The updated plan

⁹³ *TRPA Threshold Evaluation*.

⁹⁴ An example of one such local group is the Tahoe Pipe Club. See Anne Knowles, “With 38 pipes draining into Lake Tahoe, are lake clarity efforts worth a billion bucks?,” *Lake Tahoe News*, January 17, 2012, at <http://www.laketahoenews.net/2012/01/with-38-pipes-draining-into-lake-tahoe-are-lake-clarity-efforts-a-fraud/>; and David Bunker, “Tahoe Pipe Club | Pointing out Tahoe’s Polluting Pipes,” *Moonshine Ink*, May 11, 2012, at <http://www.moonshineink.com/news/tahoe-pipe-club-pointing-out-tahoe%3F%3F%3Fs-polluting-pipes>.

⁹⁵ The update to the Regional Plan originally had been scheduled to be passed in 2007 (20 years after the original Regional Plan was passed). The update was enacted, in part, beginning February 2013. Some provisions are still waiting to be enacted. Kathryn Reed, “TRPA Board Approves Regional Plan Update,” *Lake Tahoe News*, December 12, 2012, at <http://www.laketahoenews.net/2012/12/trpa-governing-board-approves-regional-plan-update/>.

⁹⁶ TRPA, *Regional Plan Update Fact Sheet*, January 2013, at http://www.trpa.org/wp-content/uploads/RPU_FactSheet_1-15-13.pdf.

also incorporates new standards and goals from the 2011 TMDL and the 2012 Regional Transportation Plan (Mobility 2035).⁹⁷

Some environmental groups have criticized these updates, stating that TRPA is placing development and business interests over the environment. Sierra Club and a local advocacy group, Friends of the West Shore, filed suit against TRPA, claiming that their members will suffer irreparable injury as a result of the update and that TRPA has failed to comply with the Bi-State Compact of 1969.⁹⁸ All claims in the suit were rejected by a federal district court, but the case has been appealed and is still ongoing.⁹⁹ Others—including the environmental nonprofit League to Save Lake Tahoe—believe the revisions to the Regional Plan will allow the plan to adapt to and address stakeholder interests, concerns, and conditions that have surfaced in the basin since 1987.¹⁰⁰ For example, reportedly, resort associations in the Tahoe Basin stated that TRPA’s old policies were unnecessarily strict and inconsistent, which stifled investment in the area.¹⁰¹ In addition, TRPA argues that the update will lead to the transfer of development into city centers and out of sensitive lands, reducing automobile use and urban runoff.¹⁰²

Complementary to the Regional Plan update, TRPA created seven new priority programs for the Tahoe Basin based on the *2011 Threshold Evaluation Report*: Stormwater Management Program; Watershed Management Program; Invasive Species Program; Forest Ecosystem and Hazardous Fuels Reduction Program; Scenic Program; Air Quality and Transportation Program; and Threatened, Endangered, and Sensitive Species Program. The federal government may have a role in each of these programs. Improving water clarity through watershed and stormwater management may be used to meet the Clarity Challenge included in the CWA Section 208 Water Management Plan.¹⁰³ Further, FWS might broaden its AIS Program to address invasive species issues in the basin and coordinate with nonfederal entities to conserve threatened and endangered species listed under ESA. In addition, USGS may have an increased role in the Tahoe Basin, working with participating universities to provide the best available science to guide restoration efforts and adapt for possible climate variability.¹⁰⁴

⁹⁷ For all changes, see http://www.trpa.org/wp-content/uploads/Summary_of_2012_TRPA_Code_Changes.pdf.

⁹⁸ Sierra Club and Friends of the West Shore v. Tahoe Regional Planning Agency (California Eastern District Court 2013), at <http://earthjustice.org/sites/default/files/FINALTahoeRPUComplaint.pdf>.

⁹⁹ Order Denying Plaintiffs’ Motion for Summary Judgment and Granting Defendant’s Cross-Motion for Summary Judgment, Sierra Club v. Tahoe Reg’l Planning Agency, No. 13-cv-00267 (E.D. Cal. Apr. 7, 2014). See http://www.gpo.gov/fdsys/pkg/USCOURTS-caed-2_13-cv-00267/pdf/USCOURTS-caed-2_13-cv-00267-2.pdf; Martin Griffith, “Environmental groups appeal Lake Tahoe plan ruling,” *Las Vegas Review Journal*, May 10, 2014, at <http://www.reviewjournal.com/news/water-environment/environmental-groups-appeal-lake-tahoe-plan-ruling>.

¹⁰⁰ Editorial by Darcie Goodman Collins, Executive Director of the League to Save Lake Tahoe. “Excited to Move Forward with Nevada on Board,” *Tahoe Daily Tribune*, June 13, 2013.

¹⁰¹ Adam Jensen, “TRPA approves Lake Tahoe Regional Plan Update, 12-1,” *Tahoe Daily Tribune*, December 12, 2012, at <http://www.tahoedailytribune.com/article/20121212/NEWS/121219952>.

¹⁰² TRPA estimates vehicle miles traveled will be reduced by 10,000 miles and projects that 24 acres of land coverage will be removed from sensitive lands. See http://www.trpa.org/wp-content/uploads/RPU_2pager_Numbers_3-251.pdf.

¹⁰³ This Clarity Challenge is set at 80 feet. The goal is to achieve this clarity by 2023 and maintain attainment for five years. *Water Board and NDEP TMDL*, p. 10-1.

¹⁰⁴ The updated EIP noted that one of the priorities was documenting and predicting effects of climate change on the Tahoe Basin and management activities.

Issues for Congress

The federal role in restoring the Tahoe Basin is significant. Congress has supported this role through legislation that authorizes funding for federal participation in restoration activities in the basin. Congress might consider retaining the existing federal role in restoration or expanding this role. Some have suggested that Congress could authorize and appropriate additional funds for implementing the EIP and other restoration efforts, conduct oversight of the development of federal projects in the Tahoe Basin, or assist in the creation and implementation of an adaptive management plan for restoration.¹⁰⁵ Some in Congress have defined the next step for federal involvement in restoring the basin by introducing legislation in past Congresses.¹⁰⁶ As introduced in the 114th Congress, S. 1724 would reauthorize funding to support state and local governments' restoration efforts in the Tahoe Basin.

Congress also might consider addressing other prevalent issues in the basin such as changing weather patterns and their effect on the ecosystem and the economy, the status and source of federal funding for restoration, what constitutes sustainable development in the Tahoe Basin and how that affects the restoration of the ecosystem, oversight and analysis of progress in restoration, and whether restoration efforts are having an impact.

Funding

Federal funding for restoration in the Tahoe Basin has come largely from mandatory funds provided under SNPLMA. As of the end of FY2012, this funding was exhausted. Based on cost-share estimates, some might contend that the federal government still is responsible for providing an additional \$480 million for restoration activities under the 2008-2018 EIP. Some question whether the federal government will be able to continue to fund restoration in the Tahoe Basin at historical levels in the current fiscal climate.¹⁰⁷ If the federal government reduces funding, it is unclear if other parties will increase funding to meet restoration needs or decrease their funding to meet cost-share requirements under LTRA of 2000. If funding is decreased by all parties, some stakeholders are concerned that restoration efforts may decline or restoration gains may be reversed.¹⁰⁸

Currently, federal funding for EIP projects is provided separately for each of the federal departments involved (DOD, DOI, USDA, EPA, DOT). Funding for hazardous fuel reduction and wildfire prevention activities and projects authorized under LTRA is authorized through SNPLMA. The Secretary of the Interior has discretion on how to manage these funds and is authorized to transfer funds to the Secretary of Agriculture or another Secretary if a funding agreement is signed. SNPLMA authorizes the Secretary to direct funding for the EIP "in an amount equal to the cumulative amounts authorized to be appropriated for such projects under

¹⁰⁵ For example, see League to Save Lake Tahoe, "Tahoe Leaders Applaud Restoration Bill," August 2, 2013, at <http://keeptahoebblue.org/news/news-main/?id=614>.

¹⁰⁶ For example, a draft bill of Lake Tahoe restoration mainly focusing on forest management and wildfire prevention was discussed recently in the House and may be introduced in the 114th Congress, with a tentative authorization of \$60 million over a 10-year period. U.S. Congress, House Committee on Natural Resources, Subcommittee on Federal Lands, *Legislative Hearing on H.R. 2270, Discussion Draft H.R. __*, 114th Cong., 1st sess., July 14, 2015, at <http://naturalresources.house.gov/calendar/eventsingle.aspx?EventID=398943>.

¹⁰⁷ For example, see TRPA, *Strategic Plan*, February 2013, at http://www.trpa.org/wp-content/uploads/Strategic_Plan_2-4-13_web.pdf, pp. 13-14. (Hereinafter *TRPA Strategic Plan*.)

¹⁰⁸ League to Save Lake Tahoe, "Tahoe Leaders Applaud Restoration Bill," August 2, 2013, at <http://keeptahoebblue.org/news/news-main/?id=614>.

such acts [referring to Lake Tahoe Restoration Act].”¹⁰⁹ Therefore, if the authorization for appropriations is expired under LTRA, it is uncertain if SNPLMA funds can be used for the EIP. Funding restoration projects under SNPLMA might require an amendment to SNPLMA to authorize funding directly (i.e., without having to reauthorize LTRA) or reauthorizing appropriations under LTRA. In addition, some question whether revenue from land sales would cover the authorized amount in the proposed legislation. SNPLMA authorized the disposal of up to 74,000 acres of federal land; only 27,071 acres remained to be sold as of September 9, 2014.¹¹⁰ With approximately one-quarter of land remaining to be sold and a declining average price per acre, it is unclear whether \$415 million could be appropriated from SNPLMA to be used toward Lake Tahoe restoration. Nevertheless, if funds for restoration activities cannot be procured under SNPLMA, restoration activities could receive discretionary funding from Congress.

Legislation proposed in the 114th Congress would address this funding dilemma by reauthorizing funding for restoration activities in the Tahoe Basin. S. 1724 would authorize \$415 million in appropriations for restoration projects in the Tahoe Basin for a period of 10 years. These projects would address water clarity, forest health, and invasive species, among other issues.

Nonfederal stakeholders are contemplating alternative sources of funding for restoration. For example, TRPA is contemplating using public-private partnerships¹¹¹ for generating funds and using proceeds from the Tahoe Fund for restoration.¹¹²

Views on Progress

Whether or not restoration in the Tahoe Basin has been implemented to receive the “biggest bang for the buck” remains controversial. Some local groups argue that little progress has been made despite the \$1.7 billion provided for restoration.¹¹³ Local groups have cited several reasons for lack of progress, including the use of ineffective technologies and management practices, a disproportionate amount of monitoring and planning activities, and the weakening of environmental protection and standards over time.¹¹⁴ Despite these criticisms, these stakeholders still support funding restoration and advocate changes in how restoration is managed. However, according to TRPA, current efforts represent the best management practices given the science information available.¹¹⁵ TRPA states that restoration efforts and monitoring have contributed to significant environmental improvements despite variations in weather and unforeseen circumstances that could have damaged the ecosystem.¹¹⁶ Scientific uncertainty about the impacts

¹⁰⁹ See Section 4(e)(3)(a)(vi) of P.L. 105-263. Note that the Fuels Reduction Program still can allocate funds above \$300 million for restoration efforts related to fuels reduction in Tahoe Basin forests.

¹¹⁰ BLM, *SNPLMA Training Modules*, September 10, 2014, at http://www.blm.gov/style/medialib/blm/nv/field_offices/las_vegas_field_office/snplma/pdf/training.Par.39955.File.dat/SNPLMA%20Training_ALL%20MODULES_09SEP14.pdf.

¹¹¹ Public-private partnerships involve contract arrangements in which a nonfederal or private entity partners with the government to contribute funds, knowledge, or labor toward a project. In return, the private or nonfederal entity is guaranteed a portion of the project’s revenue as repayment.

¹¹² The Tahoe Fund receives proceeds from specialty California and Nevada license plates, as well as donations from individuals, corporations, and foundations, which are used to help fund EIP efforts.

¹¹³ For example, see the Tahoe Pipe Club. Anne Knowles, “With 38 Pipes Draining into Lake Tahoe Are Lake Clarity Efforts Worth a Billion Bucks?” *Lake Tahoe News*, January 17, 2012, at <http://www.laketahoenews.net/2012/01/with-38-pipes-draining-into-lake-tahoe-are-lake-clarity-efforts-a-fraud/>.

¹¹⁴ Ibid.

¹¹⁵ *TRPA Strategic Plan*, p. 10.

¹¹⁶ Ibid.

of changing precipitation patterns and warming temperatures on the environment makes it challenging to quantify the benefits or progress stemming from particular restoration activities.¹¹⁷

Some local groups contend that current restoration approaches in the Tahoe Basin are ineffective in restoring the ecosystem.¹¹⁸ For example, in the past, the Tahoe Pipe Club contended that the watershed management practices used by TRPA did not adequately address runoff that enters the lake. They noted that ineffective management practices could have contributed significantly to the decline in water quality during summer months. This issue may be exacerbated by the fact that half of EIP funding goes toward water quality and stormwater management projects. Other stakeholders, however, cite improving annual and winter water clarity as signs that water management strategies are leading to progress.¹¹⁹ They state that there are multiple factors affecting water quality that are outside the scope of restoration, such as changes in precipitation patterns and water temperatures. Stakeholders contend that the measures in place have prevented greater environmental decline from these outside factors.¹²⁰

In addition, in public comment documents, individual citizens contended that restoration funds are distributed inefficiently, which has hampered progress.¹²¹ Some residents claim that too much of the funding goes toward monitoring and assessment plans and activities that do not contribute to actual restoration.¹²² Further, they contend that TRPA and other agencies involved in restoration should require proof that a project will have tangible environmental benefits before providing funding. However, other stakeholders argue that monitoring and assessment activities contribute by informing future decisionmaking.¹²³ Scientists have been continuously monitoring Lake Tahoe continuously since 1968, and they state these long-term data provide insight into management practices that work in the Tahoe Basin by allowing stakeholders to measure the progress of restoration over time. TRPA also contends that monitoring may become more important as agencies and stakeholders consider new measures to address the changing climate.¹²⁴

Congress may consider conducting oversight on restoration and progress in the Tahoe Basin. Several policies used by other large-scale ecosystem restoration initiatives could be applied to the Tahoe Basin and EIP. For example, crosscut budgets could be used to organize and identify restoration projects and track their funding and status on an annual basis. These types of budgets are used in restoration initiatives in the Everglades and the Great Lakes. Further, Congress could authorize an independent entity to review progress and issues associated with restoration in the Tahoe Basin. For example, restoration in the Everglades and in some selected cases in the California Bay-Delta is analyzed and reviewed by the National Research Council (NRC). NRC conducts independent reviews of the scientific and some policy factors in these restoration

¹¹⁷ For example, the gains in winter, summer, and annual water clarity in 2012 may be due to stormwater management efforts or to decreased precipitation in the previous year, which led to decreased total levels of runoff, or some combination of both. This effect also can be seen in the 2013 decrease and the recent 2014 increase in clarity, given the increased precipitation and exacerbated drought conditions, respectively. *TERC State of the Lake Report 2015*.

¹¹⁸ For example, see Anne Knowles, “With 38 pipes Draining into Lake Tahoe Are Lake Clarity Efforts Worth a Billion Bucks?” *Lake Tahoe News*, January 17, 2012.

¹¹⁹ Examples include TRPA and the Tahoe Environmental Research Center. See *TRPA Strategic Plan*, p. 9.

¹²⁰ *Ibid.*

¹²¹ For example, see public comments recorded in TRPA, *Advisory Planning Commission Meeting*, August 3, 2011, at http://www.trpa.org/wp-content/uploads/aug_2011_apc_packet.pdf.

¹²² Richard Frank, “Environmentalists Sue Over New Lake Tahoe Plan: Is the Perfect the Enemy of the Good,” *Legal Planet*, February 20, 2013.

¹²³ *TERC State of the Lake 2013*.

¹²⁴ *TRPA EIP Update*.

initiatives. S. 1724 would address this issue by requiring federal agencies to present Congress with an annual report that contains a crosscut budget and detailed accounting of received and obligated funding to achieve EIP goals.

Balancing Restoration and the Economy

There has been controversy between environmental and development interests in the Tahoe Basin.¹²⁵ Some local business associations reportedly have contended that limits on development derived from the Regional Plan inhibited economic growth in the basin.¹²⁶ The Tahoe Basin economy relies in part on the preservation of the environment; growth of the economy may require both additional development and improved environmental health of the basin, according to TRPA.¹²⁷ Due to the connection between recreation, tourism, development, and the environment, some contend that sustainable development in the region is warranted. Some environmental groups, however, contend that limits on development have led to significant environmental gains in the Tahoe Basin and are necessary for maintaining progress in restoration.¹²⁸ This controversy was addressed at the state level through negotiations between Nevada and California. Specifically, Nevada contended that permitting processes and limits on development had led to the decline of economic growth in the basin, in particular the gaming industry.¹²⁹ To address this issue, the Nevada legislature passed a law (SB 271) in 2011 that required the state to leave the Bi-State Compact in 2015 unless the compact was amended to consider economic conditions and the effect of environmental regulations on the economy when making decisions on development. This law was repealed in 2013 as a result of negotiations between California and Nevada.¹³⁰ Changes to the Regional Plan in 2012 were made, in part, in response to Nevada's concerns about development.¹³¹ Negotiations between California and Nevada resulted in certain agreements that addressed amending the compact. The agreement included two potential amendments to the compact. Generally, the agreement included that

- The Regional Plan should reflect changing economic conditions in the Tahoe Basin and the economic effects of regulations on commerce; and
- Any party that brings litigation against the Regional Plan or TRPA has to have a higher burden of proof that the Regional Plan is not in conformance with the compact.

Both states have signed the amendments to the compact into state law, and the amendments now require congressional approval. S. 1724, in addition to reauthorizing federal funding for restoration activities in the Tahoe Basin, would approve these amendments.

¹²⁵ *TRPA Strategic Plan*, p. 5.

¹²⁶ Adam Jensen, "TRPA Approves Lake Tahoe Regional Plan Update, 12-1," *Tahoe Daily Tribune*, December 12, 2012, at <http://www.tahoedailytribune.com/article/20121212/NEWS/121219952>.

¹²⁷ *TRPA Strategic Plan*, p. 8.

¹²⁸ For example, see *Sierra Club and Friends of the West Shore v. Tahoe Regional Planning Agency* (California Eastern District Court 2013).

¹²⁹ Darcie Goodman-Collins, Executive Director of the League to Save Lake Tahoe, "Excited to Move Forward with Nevada on Board," *Tahoe Daily Tribune*, June 13, 2013.

¹³⁰ Office of Governor Edmund G. Brown Jr., "Nevada and California Renew Partnership to Preserve, Enhance Lake Tahoe Region," press release, May 14, 2013, at <http://gov.ca.gov/news.php?id=18041>.

¹³¹ Shelly Aldean and Casey Beyer, *Moving Forward for Lake Tahoe*, TRPA, April 2013, at http://www.trpa.org/wp-content/uploads/COLUMN_GB_Compact_April_2013.pdf.

Updates to the Regional Plan in 2012 allowing for additional development and increased local control of development have led to litigation.¹³² If the Regional Plan is struck down, some contend that Nevada will leave the Bi-State Compact. This outcome could result in TRPA being dissolved and two regional planning agencies being created, one for managing development on the California side of the basin and one for managing development on the Nevada side. If this happens, the federal role in restoration and collaboration with TRPA and EIP would be unclear. The current controversy could be addressed by Congress through oversight or legislation.

Climate Change

Changing weather patterns in the Tahoe Basin may have adverse impacts on the Tahoe Basin ecosystem and ongoing restoration and management efforts. Scientists have noted significant trends of warming temperatures in the past century, especially in the past two decades. For example, since 1910, average air temperatures have increased by approximately four degrees Fahrenheit; since 1970, the average lake water temperature has increased by around one degree Fahrenheit.¹³³ Changes in weather and increased weather variability have raised concerns about the future environmental and economic health of the Tahoe Basin. In response to these concerns, stakeholders have begun to formulate basin-wide strategies to address climate change. Further, the state of California has done surveys to estimate the economic effects of climate change in the Tahoe Basin. In addition to these efforts, some contend that more resources should be directed toward scientific research and adaptive management of restoration in the Tahoe Basin.

Scientists have predicted that changes in weather and increased weather variability in the Tahoe Basin may have negative impacts on the ecosystem.¹³⁴ For example, an increase in winter flooding (e.g., caused by earlier snowmelt and increased winter rains) may lead to a decline in water quality due to higher levels of urban runoff and debris entering the lake.¹³⁵ At the same time, scientists have expressed concern that hotter summers may lead to higher levels of drought, thereby increasing the risk of wildfires.¹³⁶ Recent drought conditions have affected water clarity, as reduced precipitation has resulted in less contaminant runoff into the basin, increasing clarity.¹³⁷ Although water clarity has improved, either due to restoration efforts or current drought conditions (or both), other areas of the basin ecosystem have been affected negatively by warmer conditions. Many of the Tahoe Basin's invasive species originate in warmer waters than Lake Tahoe.¹³⁸ Therefore, increased water temperatures may help nonnative species outcompete native species. Water quality also may decrease due to physical changes in water circulation brought on by climate variability. Lake Tahoe, like many lakes, stratifies into distinct thermal layers of water. Seasonal changes promote the mixing of these distinct layers, which allows for oxygen and other nutrients to spread throughout the lake's water column. Warmer temperatures in the Tahoe Basin

¹³² *Sierra Club and Friends of the West Shore v. Tahoe Regional Planning Agency* (California Eastern District Court 2013).

¹³³ Observations recorded by Tahoe Environmental Research Center at UC Davis. Found in *TERC State of the Lake 2013*.

¹³⁴ *TERC State of the Lake Report 2013*, Executive Summary.

¹³⁵ For example, 2011 was one of the wettest and coldest winters on record.

¹³⁶ Robert Coats and Kelly Redmond, *Climate Change in the Tahoe Basin*, Tahoe Science Consortium, 2011, at <http://www.tahoescience.org/wp-content/uploads/2011/10/LTFedEvent-2008-Climate-Change-WQ-Poster.pdf>.

¹³⁷ TERC, "Lake Tahoe water clarity in 2014 the best in more than a decade," press release, April 2015, at <http://terc.ucdavis.edu/research/monitoring/water-clarity.html>.

¹³⁸ U.S. Army Corps of Engineers, *Lake Tahoe Region Aquatic Invasive Species Management Plan, California-Nevada*, September 2009, at http://anstaskforce.gov/State%20Plans/Lake_Tahoe_Region_AIS_Management_Plan.pdf.

have, in part, extended the lake's period of stratification, which may reduce the depth to which water mixes.¹³⁹ For example, in 2014, the maximum mixing depth was 440 feet, as compared with 590 feet in 2013 and 820 feet in 2012.¹⁴⁰ Some researchers are concerned that the reduced mixing time may lead to complete anoxia of bottom waters later in the century.¹⁴¹ The impacts from these changes could have long-lasting effects on the trophic structure and ecosystem of the basin.

Changing weather patterns in the Tahoe Basin may lead to changes in restoration strategies. For example, increased wildfire risk may require FS to modify its forest management plan¹⁴² to include a stronger emphasis on hazardous fuel reduction and tree thinning activities. Changes in water quality might require changes in regulatory actions under the CWA (e.g., changes in strategies for achieving TMDLs).

Congress could address this issue by authorizing additional funds for scientific and adaptive management efforts within the Tahoe Basin. Congress also could authorize increased federal participation in efforts to create new or adaptive strategies to address climate change in the basin. For example, under S. 1451, introduced in the 113th Congress, \$30 million would have been authorized for FS to develop and implement, in coordination with the Tahoe Science Consortium, the Lake Tahoe Basin Science Program.¹⁴³ The science program would have developed and regularly updated integrated multiagency programmatic monitoring and assessment plans to measure and evaluate progress and assess the risks and impacts of changing weather patterns. In addition, the Lake Tahoe Basin Science Program would have provided scientific and technical support for the development of appropriate management strategies that would accommodate changing weather and precipitation in the Tahoe Basin.¹⁴⁴

Conclusion

The Lake Tahoe Basin is considered by some to be an area of national significance and is recognized by the EPA as an Outstanding National Resource Water under CWA. The basin provides both recreational and environmental services and is tied to the regional economy. Over the years, development in the Tahoe Basin has led to alterations in its ecosystem. These changes have prompted federal, state, local, and private efforts to conduct restoration. Since 1997, restoration efforts among stakeholders have been organized largely under the EIP. Many use this date to evaluate progress in restoration.

¹³⁹ Since 1969, the stratification season has been extended by an average of 25 days. *TERC State of the Lake Report 2013*.

¹⁴⁰ Data from *TERC State of the Lake 2013* and *TERC State of the Lake 2014*.

¹⁴¹ *Anoxia* refers to the total depletion of oxygen in the water, in this case the bottom waters of Lake Tahoe. Due to the lack of mixing in the bottom waters, TERC currently is monitoring oxygen levels in the deepest part of the lake to determine the rate at which oxygen is being lost when mixing does not occur. *TERC State of the Lake 2013*, Section 2; Lisa Borre, "Warming Lakes: Effects of Climate Change Seen on Lake Tahoe," *National Geographic Water Currents*, October 17, 2012, at <http://newswatch.nationalgeographic.com/2012/10/17/warming-lakes-effects-of-climate-change-seen-on-lake-tahoe/>.

¹⁴² Forest management plans are comprehensive plans, created with input from the public and scientific communities. They detail the objectives FS has for a specific national forest (in this case Tahoe National Forest) and include management plans (i.e., timber management, hazardous fuel management, and climate change adaptation) to achieve the objectives.

¹⁴³ See Section 8 and Section 12 of S. 1451 (113th Congress).

¹⁴⁴ See Section 12 of S. 1451.

Some contend that significant restoration progress has been made in the Tahoe Basin since 1997.¹⁴⁵ They cite the recent threshold evaluations, which indicate that more than half of the studied environmental indicators established in the 1980s have been reached. They note that more than 500 restoration projects have been completed or are ongoing, contributing to more than 50,000 acres of treated or restored lands, 600 miles of treated roads, and 15,000 acres of restored wildlife habitat. Although progress in restoration has been reported, some environmental concerns remain. Lake Tahoe faces continued water pollution that has contributed to a loss of a third of its water clarity in the past 40 years. Annual clarity is stabilizing and winter clarity is showing improvement, but it is expected to take until 2077 for the lake to return to its historical clarity, according to TMDL. Further, although efforts to reduce fuel loads have been implemented, some suggest it will take decades before forests return to a healthy state.¹⁴⁶ Additionally, while there have been improvements in the air quality of the Tahoe Basin, efforts to curb automobile use in the area continue. Sensitive and listed species' populations show signs of stability or improvement, but invasive species continue to threaten native species populations. Future restoration activities in the basin may address water quality, invasive species, climate change adaptation, land use, and forest management.

The federal government has played a significant role in restoring the Tahoe Basin ecosystem. It is unclear how this role might evolve due to changes in federal funding and state actions centering on potential changes to the compact. Recently, the compact was amended by both California and Nevada to reflect changing economic conditions in the basin and its treatment as an urban area. Congressional approval of these amendments has been proposed in S. 1724. At the same time, there is ongoing litigation regarding the updated conditions made to the compact, the outcome of which may alter the involvement of California and Nevada in the restoration of Lake Tahoe. Federal involvement will continue through efforts under laws such as the LTRA 2000, CWA, CAA, and ESA. Further, federal funding for various restoration activities through SNPLMA has ended, and legislation such as S. 1724 could expand federal collaboration and participation with nonfederal stakeholders in restoration efforts and reauthorize federal funding for implementing restoration projects and activities.

¹⁴⁵ *TRPA Threshold Evaluation*.

¹⁴⁶ *Trees in Transition*.

Appendix. Chronology of Lake Tahoe Basin

2 Million-3 Million Years Ago	Lake Tahoe Basin and Lake Tahoe are formed.
10,000 Years Ago	First appearance of nomadic groups in the Tahoe Basin. These nomads were the ancestors of the current Washoe, Maidu, and Paiute Indian Tribes.
1844	John C. Fremont is the first American to sight Lake Tahoe. He was leading expedition parties on the Oregon Trail and into the Sierra Nevadas.
1852	The first permanent American settlement is established in the Tahoe Basin.
1859	The Comstock Lode is discovered in nearby Virginia City. More than 20,000 prospectors move to Virginia City to mine for silver and gold.
1860s-1890s	To accommodate the growing number of settlers in the area, Tahoe Basin forests are cut for timber and fuel. This becomes known as the <i>Comstock Era</i> .
1864	Tahoe City founded as a resort community for Virginia City residents.
1880	4,000-foot tramway completed for carrying lumber. By 1896, when the lumber flume was shut down, more than 60% of the mature trees in the forest had been cut down since operation began in 1880.
1887	The Mackinaw (lake) trout is introduced in Lake Tahoe for sport-fishing purposes.
1889	The California legislature passes an anti-sawdust statute preventing mills from dumping sawdust into Truckee River. The Nevada Legislature had passed resolutions calling for California to prevent dumping as early as 1869.
1899	The Lake Tahoe Forest Reserve is created by the federal government. It covers 136,000 acres of forest in the Tahoe Basin. First attempt in Congress to make Lake Tahoe a national park. There were subsequent efforts in 1913, 1930, and 1935. All efforts failed, reportedly due to the environmental degradation from development in the area.
1911	The U.S. Forest Service (FS) builds its first station in the Tahoe Basin.
1920	By 1920, FS owns 25% of all Tahoe Basin land.
1927	First state park created in the Tahoe Basin by the state of California. The state of California now manages three parks and a recreation area in the Tahoe Basin.
1931	Nevada legalizes gaming; 5,000 tourists from California visit Nevada in the first week.
1938-1944	The Pyramid Lake cutthroat trout, once the largest and most plentiful fish in the Tahoe Basin, officially becomes extinct due to overfishing and water diversions. Its cousin, the native Lahontan cutthroat trout, is purposefully reintroduced into the area for fishing.
1949	Both the California and Nevada legislatures pass laws prohibiting disposal of waste into Lake Tahoe or within 100 feet of tributaries. Nevada also begins to require permits for new construction that will involve discharge of waste in those areas.
1955	California and Nevada form the California-Nevada Interstate Compact Commission to respond to interstate issues concerning Lake Tahoe and Truckee River. This commission is active until the creation of the Tahoe Regional Planning Agency (TRPA) by the Bi-State Compact in 1969.
1958	Sand Harbor State Park becomes the first Nevada state park in the Tahoe Basin. It is incorporated into the larger Lake Tahoe Nevada State Park in 1967.
1959	The University of California, Davis, begins scientific research on Lake Tahoe. This becomes the Tahoe Environmental Research Center.
1960	Neighboring Squaw Valley holds the 1960 Winter Olympics.
1962	The first secchi disc reading is done in Lake Tahoe. Clarity is measured at 136 feet.

1965-1980	FS begins a policy to acquire all available parcels of land in the Tahoe Basin and purchases more than 36,000 acres over the next 15 years.
1965	The state of California and the state of Nevada create a joint study commission to investigate worsening environmental problems in the Tahoe Basin.
1969	The Bi-State Compact is ratified by Congress. TRPA is formed.
1970	The Lahontan cutthroat trout is listed as endangered under the Endangered Species Conservation Act of 1969 (replaced by the Endangered Species Act, or ESA, in 1972).
1975	The Lahontan cutthroat trout is downgraded to threatened under the ESA due to hatchery success.
1976	More than 70% of the Tahoe Basin is publicly owned.
1980	On December 19, 1980, the Bi-State Compact is amended to include the development of a regional plan and environmental thresholds, among other things.
1980	The Santini-Burton Act (P.L. 96-586) is passed. The act authorized FS to acquire environmentally sensitive lands, restore watershed on federal forest lands, and administer erosion control grants to local government. To date more than 13,000 acres have been purchased under this act.
1981	The first moratorium on development in the Tahoe Basin goes into effect on August 24, 1981, until August 26, 1983.
1982	The environmental thresholds are adopted by TRPA in August.
1983	The second moratorium on development in the Tahoe Basin goes into effect until April 25, 1984. It is considered more restrictive than the earlier version.
1984	The first (1984) Regional Plan is adopted. However, that same day the state of California placed an injunction on the plan on the grounds that it is not stringent enough to protect the Tahoe Basin.
1987	After litigation and negotiations, the completely revised 1987 Regional Plan is successfully adopted.
1996	<p>The Bureau of Land Management finalizes a land exchange of 1,400 acres of Las Vegas land for 35 acres of Lake Tahoe property. The 35 acres are given to FS.</p> <p>Nevada and California voters approve \$30 million for erosion control and stream restoration in Tahoe Basin.</p>
1997	President Clinton holds the Lake Tahoe Presidential Forum. Under Executive Order 13507, the Lake Tahoe Federal Interagency Partnership and the Environmental Improvement Program (EIP) are created to assist with meeting the Regional Plan.
2000	The Lake Tahoe Restoration Act of 2000 (P.L. 106-506) is signed, authorizing \$300 million for EIP restoration projects.
2003	The Southern Nevada Public Lands Management Act (SNPLMA; P.L. 105-263) is amended, appropriating \$300 million toward EIP restoration projects.
2006	SNPLMA is amended to include funding for a Hazardous Fuels Reduction and Treatment Program.
2007	The Angora Wildfire burns 3,100 acres in the Tahoe Basin, destroying 254 residences and 75 commercial structures, damaging another 35 residences, and injuring 3 people.
2008	The Aquatic Invasive Species Program is created.
2008	The EIP is updated by TRPA to guide the second decade of the capital improvement program.
2009	Lahontan cutthroat trout recovery begins.
2011	The final total maximum daily load (TMDL) is approved by the EPA for Lake Tahoe. The TMDL sets the clarity standard for the lake at 97 feet.
2012	The Regional Plan is updated for the first time since 1987. The update becomes effective in 2013.

- 2012 SNPLMA finishes its \$300 million dollar funding commitment toward Lake Tahoe restoration.
- 2013 Tahoe Regional Planning Compact is amended and Regional Plan is updated by California and Nevada to allow new development in the Tahoe Basin area.

Author Information

Pervaze A. Sheikh
Specialist in Natural Resources Policy

Charles V. Stern
Specialist in Natural Resources Policy

Acknowledgments

Samuel Kim contributed to this report.

Disclaimer

This document was prepared by the Congressional Research Service (CRS). CRS serves as nonpartisan shared staff to congressional committees and Members of Congress. It operates solely at the behest of and under the direction of Congress. Information in a CRS Report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to Members of Congress in connection with CRS's institutional role. CRS Reports, as a work of the United States Government, are not subject to copyright protection in the United States. Any CRS Report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS Report may include copyrighted images or material from a third party, you may need to obtain the permission of the copyright holder if you wish to copy or otherwise use copyrighted material.